



Factors Influencing Types of Domestic Violence with Multinomial Logistic Regression

Muhammad Marizal¹, Yusnita Hasibuan²

^{1,2}Department of Mathematics, Faculty of Science and Technology, Universitas Islam Negeri Sultan Syarif Kasim Riau

ARTICLE INFO	ABSTRACT
Published Online: 09 March 2023	Domestic Violence is an act of a person against another person which results in physical, sexual, psychological suffering and/or neglect of the household, including coercion and deprivation of liberty as well as threats to commit acts that are against the law within the household sphere. Domestic violence is usually influenced by several factors such as age, education level of the victim, area, place of incident, sex of the perpetrator, the nationality of the perpetrator, the type of relationship between the perpetrator and the victim, family income, and the number of children or dependents. The dense population of Indonesia causes many social problems in society, one of which is domestic violence. Research on domestic violence requires observations with large enough data so that researchers are interested in conducting an analysis using multinomial logistic regression. The data used in this study is secondary data obtained by the Riau Province Child and Women Empowerment Service. This study aims to obtain a general model and determine the indicators of the variables that have a significant effect on domestic violence. The results showed that the education level of the victim, the type of relationship between the perpetrator and the victim, and the number of children were significantly related to domestic violence. Based on the model fit test, the most appropriate model for data on domestic violence is Pearson
Corresponding Author: Muhammad Marizal	
KEYWORDS: Domestic Violence, Pearson Model, Multinomial Logistic Regression	

I. INTRODUCTION

Allah SWT created humans as social beings to complement each other, to live in pairs, and to help each other, that's why there is a marriage bond between women and men. The purpose of a husband and wife relationship is to create happiness in a peaceful and lasting family [1]. But life in a household certainly does not run smoothly because there are differences in nature, character, education, life vision, and other factors that can cause conflict and violence. Violence is an action against an individual or group that occurs as a condition that is unpleasant, detrimental, burdensome, and has a very bad effect physically, psychologically and spiritually [2].

Violence arises due to the paradigm situation within the family sphere, where there is an imbalance between family members. Because the family relationship model must be built on a foundation of trust, so that when domestic violence is detected, two things occur simultaneously, namely abuse

of power and abuse of trust. As a result, this violence does not occur independently, but as part of a long-term relationship that creates dependence and vulnerability on behalf of the victim [3]. Throughout 2020 a total of 299,911 cases of domestic violence were handled by 1) District Courts and Religious Courts with a total of 291,677. 2) 8,234 Komnas Perempuan partner service institutions. 3) Komnas Perempuan Service and Referral Unit (UPR) with a total of 2,389, recorded 2,134 were gender-based cases and 255 of them were not gender-based or provided information. In the 2021 calendar year, there has been a significant change in the number of cases. The summary shows that the ability to record and document violence against women in. Service institutions and on a national scale are a shared priority [4]. In 2020, 299,911 cases were recorded, this has decreased by 31% compared to 2019 with 431,471. Because the returned questionnaires decreased 100% from the previous year. The total number of questionnaires returned was 239 in the

“Factors Influencing Types of Domestic Violence with Multinomial Logistic Regression”

previous year, but only 120 were returned in 2020. Approximately 34% of institutions that returned questionnaires stated that there had been an increase in the number of case claims during the pandemic. Data complaints recorded at Komnas Perempuan also experienced a drastic increase of 60% per 1,413 cases in 2019 to 2,389 cases in 2020 [5]. This study aims to look at the aspects that influence cases of violence within the family and make a report to the police. From the research, it was found that 75 cases of marital violence were related to financial problems, 71 cases of extramarital affairs, 2 cases of number of children, and 61 cases of social culture. There is no significant relationship between economic problems ($\rho=0.812$), infidelity ($\rho=0.358$), number of children ($\rho=1.000$), and police. Multivariate analysis was not carried out because the ρ value of each variable factor was > 0.25 . Economic issues are the most important factor in determining whether there is domestic violence [6].

Given the importance of this problem, an analysis is carried out to look at the factors that influence types of domestic violence so that the government can take action and implement policies that will reduce the number of cases of domestic violence and prevent unwanted things from happening, as well as getting the most appropriate solution to the problem of domestic violence [7]. The method that can be used is the multinomial logistic regression method. The selection of the multinomial logistic regression analysis method is used to link causation between the independent variables and the dependent variable where the dependent variable has three or more categories [8]. The researcher is interested in doing the final assignment based on the context that has been described with the research title "Factors that

influence the types of internal violence with Multinomial Logistic Regression".

II. METHOD

The dependent variable used in this study is Domestic Violence (KDRT) in 2021 which was recorded by the Women and Children Empowerment Service for Riau province. The independent variables used were age [9], education level of the victim [10], area [11], place of incident, sex of the perpetrator, the nationality of the perpetrator [12], and the type of relationship between the perpetrator and the victim [8], family income, and the number of children or dependents. The methodology used is multinomial logistic regression, in general, is to estimate parameters to determine the value of the estimator, tests are carried out simultaneously to find whether or not the independent variable (X) has the most influence on the dependent variable (Y). In addition, the estimation of the β parameter uses the maximum likelihood method because the expectations between the independent variables are non-linear and there are many differences [13].

A. Multinomial Logistic Regression

Multinomial logistic regression is defined as a logistic regression model used when the dependent variable has polychotomous characteristics, namely the value of the dependent variable consists of three or more categories. The multinomial logistic regression method is used to find at least one independent variable that affects variables that have two or more categories [14]. For example $P(y = j | x) = \pi_j(x)$ where $j = 0, 1, 2, 3, \dots, k-1$ is the nominal variable used to determine the conditional distribution for each group:

$$P(y = j | x) = \frac{\exp(g_j(x))}{1 + \sum_{j=0}^{m-1} \exp(g_j(x))} \quad 1$$

Suppose there are three categories in the dependent variable (Y) with codes 0, 1, 2, then three conditional distribution functions are obtained in this multinomial logistic regression

$$\begin{aligned} g_1(x) &= \beta_{10} + \beta_{11}x_1 + \beta_{12}x_2 + \beta_{13}x_3 + \dots + \beta_{1p}x_p & 2 \\ g_2(x) &= \beta_{20} + \beta_{21}x_1 + \beta_{22}x_2 + \beta_{23}x_3 + \dots + \beta_{2p}x_p & 3 \end{aligned}$$

The methodology in multinomial logistic regression analysis in general is to estimate the parameters to determine the value of the estimator. The non-linear system of equations can be solved by trying to estimate β through the Newton Raphson iteration process [16]. If indeed the dependent variable Y has more than two possibilities, then the dependent variable Y has a multinomial distribution. To get the likelihood function in models with more than 2 response categories (eg 3 categories) the main thing to do is to create

[15]. According to Hosmer, for a multinomial logistic regression problem consisting of three groups requiring two logit functions, it can be written as follows:

3 binary variables coded 0 or 1 to mark group membership in an observation [17].

III. RESULT

A. Descriptive Analysis

The data on household violence used in this study is data on the number of acts of violence recorded by UPT PPA Riau Province in 2021. The level of domestic violence has increased and decreased every year. The following is a pie chart of levels of domestic violence by type, presented in Figure 2.

“Factors Influencing Types of Domestic Violence with Multinomial Logistic Regression”

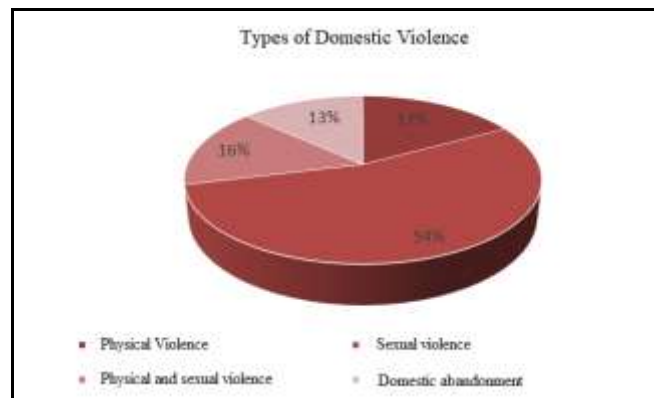


Fig.1. Pie Chart of Types of Domestic Violence

Based on the pie chart in Figure 1, it can be shown that there are different levels of types of domestic violence in 2021 in Riau Province. The category of violence with the highest number was classified as sexual violence by 54% with a total of 101 cases. While the category of violence with the lowest number was in the type of household neglect by 13% with a total of 25 cases. The results of data analysis for variable X can be seen in Table 1 as follows

B. Data Analysis

Data processing using the help of SPSS 22 software to obtain a multinomial logistic regression model.

Step 1. Parameter estimation. The test for the significance of the parameters is by using the Wald test [18]. The following

Table 1. Variable Significance

Variable	β	S.E	df	Sig.
x_1	3082.800	22.450	18	0.213
x_2	311.000	30.692	15	0.010
x_3	320.864	40.538	30	0.095
x_4	289.300	8.952	6	0.176
x_5	281.800	1.440	3	0.696
x_6	292.300	11.937	9	0.217
x_7	291.000	10.628	3	0.014
x_8	300.400	20.038	12	0.066
x_9	377.951	97.624	6	0.000

Step 2. Parameter testing, carried out simultaneously and partially.

Table 2. Simultaneous Test Results

Model	-2 logLikelihood	Chi- Square	df	Sig.
Intercept Only	489.423			
Final	280.326	209.097	102	0.000

Based on the simultaneous test results in Table 2, it shows a p-value (sig.) of 0.000. Where the value is smaller than $\alpha = 0.05$, then reject H_0 , which means that there is at least one

presents the results of the estimation of the parameter β in Table 1.

From Table 2, it can be seen that there are three variables that significantly influence domestic violence, namely x_2 , x_7 , x_9 , where the significance value is less than $\alpha = 0.05$, which means that the variables x_2 , x_7 , x_9 , have a relationship with variable Y.

independent variable which is statistically significant influencing the response variable. Because the simultaneous test stated significant, then proceed to the partial test

“Factors Influencing Types of Domestic Violence with Multinomial Logistic Regression”

Table 3. Partial Test Results

<i>Effect</i>	<i>-2 Likelihood of Reduced Model</i>	<i>Log of Chi- square</i>	<i>df</i>	<i>Sig.</i>
x_1	3082.800	22.450	18	0.213
x_2	311.000	30.692	15	0.010
x_3	320.864	40.538	30	0.095
x_4	289.300	8.952	6	0.176
x_5	281.800	1.440	3	0.696
x_6	291.000	10.628	3	0.014
x_7	292.300	11.937	9	0.217
x_8	300.400	20.038	12	0.066
x_9	377.951	97.624	6	0.000

Based on the partial test results in Table 3, it shows three variables with a value of $\alpha = 0.05$. Thus, the three independent variables are significant to the dependent variable.

Step 3. Model suitability test [19], The results of the model suitability test are obtained in Table 5 as follows:

Table 4. Model Fitment Test Results

	Chi-Square	Df	Sig.
Pearson	402.115	444	.924
Deviance	274.781	444	1.000

Based on the results in Table 4, it is obtained that the p-value (sig.) is more than $\alpha = 0.05$, so accept H_0 , which means that the model formed is appropriate or in other words there is no significant difference between the observed results and the possible predictions of the model.

Step 4. Interpretation of multinomial logistic regression analysis, the parameters forming the logit function are presented in Table 5 obtained from the β value, while the odds ratio values are presented in the column $\exp(\beta)$ in Table 5.

Table 5. Logit function Forming Parameters

	β		
	1	2	3
<i>Constant</i>	-6.338	-110.418	-44.650
$[x_2=4]$	3.854	–	4.515
$[x_7=0]$	3.802	–	–
$[x_7=2]$	3.477	–	–
$[x_9=1]$	4.663	5.937	5.348

Formed based on the value of β , the logit model equation is obtained as follows:

$$P_1(x) = -6,338 + 3,854x_2(4) + 3,802x_7(0) + 3,477x_7(2) + 4,663x_9(1)$$

$$P_2(x) = -110,458 + 5,937x_9(1)$$

$$P_3(x) = -44,650 + 4,515x_2(4) + 5,348x_9(1)$$

Furthermore, the calculation of the odds ratio value based on the equation in each significant category can be seen in Table 6.

Table 6. Interpretation of Multinomial Logistic Regression Analysis

Variable	β		
	Sexual Violence and Physical Violence	Physical and Sexual Violence And Physical abuse	Household Abandonment And Physical Violence

“Factors Influencing Types of Domestic Violence with Multinomial Logistic Regression”

$Exp(\beta)$	0.0018	1.068	4.062
$[x_2=4]$	47.190	–	91.383
$[x_7=0]$	44.784	–	–
$[x_7=2]$	32.361	–	–
$[x_9=1]$	105.999	378.693	210.199

Based on Table 6, the variable (x_2) or the classification of the education level of the victim with S1 as a control shows that domestic violence at the high school level tends to be more at risk of sexual violence by $exp(3,854)=47,190$ compared to physical violence, which means that every

increase one unit value of the victim's education level variable, it will affect domestic sexual violence by 47,190 times, as well as for the conclusions of other variables.

Table 7. Model Classification Accuracy

<i>Observed</i>	<i>Predicted</i>				<i>Percent Correct</i>
	Physical Violence	Sexual Violence	Physical and Sexual Violence	Household Abandonment	
Physical Violence	26	6	0	0	81,2 %
Secual Violence	5	45	6	10	68,2%
Physical and Sexual Violence	2	9	15	3	51,7%
Household Abandonment	5	13	2	40	66,7%
<i>Overall Percentage</i>	20,3 %	39,0%	12,3%	28,3 %	67,4%

After testing the suitability of the model, then measuring the accuracy of the classification of the multinomial logistic regression model was carried out. Based on Table 7, it can be seen that the classification accuracy of each category is category one (physical violence) as many as 32 cases, 26 cases of physical violence (81.2%) are classified correctly based on the logistic regression model obtained, for category two (sexual violence) as many as 65 cases, 45 cases of sexual violence (68.2%) were classified correctly based on the regression model obtained, then for category three (physical and sexual violence) there were 29 cases, 15 cases of physical and sexual violence (51.7%) were classified correctly based on the logistic regression model was obtained, and the fourth category (household neglect) was 60 cases, 40 cases of household neglect (66.7%) were classified correctly based on the regression model obtained. Overall the resulting classification accuracy is 67.4%. The value of the classification accuracy obtained was quite large so that it was gathered that the multinomial logistic regression model that was formed was quite good.

IV. DISCUSSION

a. Effect of the level of education of the victim on domestic violence

Improving the quality of human resources can be seen from the increasing average level of education in a region. This increase is the result of the increasing demand for education in order to get a job with a better income, because getting a job in the modern sector is highly dependent on education which also greatly influences domestic violence. Based on various studies, there are several factors that influence the level of education on domestic violence, including [20]:

1. Unpreparedness to face adulthood/family. Women with lower levels of education are less prepared to enter adulthood. Where the period of adulthood is a period of adjusting to new life patterns and expectations as well as carrying out new roles and growing into a mature person [21].
2. Low emotional maturity. Women/men with this level of education have low emotional maturity, because someone thinks emotionally about getting married, they think they love each other and are ready to get married. Whereas married life requires emotional maturity and

“Factors Influencing Types of Domestic Violence with Multinomial Logistic Regression”

thinking to deal with and control the nature of marriage and the role of parents that will be carried [22].

3. Low ability to contribute. Women/men with low levels of education are not able to contribute optimally, both to the family and society. Women/men with low levels of education are less able to earn income and contribute financially to the family [23].
4. Lack of academic ability. Some men/women who are lacking in academics prefer to marry young. This is because, both of them, parents think that the decision to marry young will be more beneficial, but with the condition that the man/woman is not mature enough in dealing with the situation [24].
- b. The influence of the type of family relationship between the perpetrator and the victim on domestic violence
Based on various studies, there are several factors that influence the type of family relationship between the perpetrator and the victim, namely the following [25]:
 1. There is an unequal power relationship between husband and wife. The notion that the husband is more powerful than the wife. And where the wife belongs to the husband because she has to carry out everything that the owner wants [26].
 2. Economic dependence. The dependency factor of a woman on her husband/man forces her to fulfill all wishes even though the victim feels suffering. Even if acts of violence were committed against him, he was still reluctant to report his suffering on the grounds that it was for his own survival and the education of his children [27].
 3. Violence as a tool to resolve conflict. This factor is usually done as an outlet for offence, or disappointment because his wish was not fulfilled [28].
 4. Competition. Where there is an imbalance of power relations between husband and wife. Where on one side the husband doesn't want to lose, while on the other hand he also doesn't want to be underdeveloped and constrained [29].
- c. The influence of the number of children or dependents on domestic violence

In general, people with low education will have a low level of income which is not sufficient to meet the necessities of life. Limitations in the economy make all the businesses of family members who are considered capable of working in order to increase family income so that the needs of family life can be met [30].

V. CONCLUSION

The multinomial logistic regression model obtained for types of domestic violence in Riau Province in 2021 consists of 3 models with a classification accuracy proportion of 67.4%. Factors that have a significant effect on the types of domestic violence in Riau Province in 2021 are the education level of the victim (x_2), the place of occurrence

(x_4), the type of relationship between the perpetrator and the victim (x_7), number of children or dependents (x_9).

REFERENCES

1. N. U. Bachri, *Pengaruh Kekerasan Dalam Rumah Tangga Terhadap Perceraian Di Kecamatan Ciputat*, vol. 4, no. 1. 2016.
2. Sutrisminah, “Dampak Kekerasan Pada Istri Dalam Rumah Tangga Terhadap Kesehatan Reproduksi | Sutrisminah | Majalah Ilmiah Sultan Agung,” *Majalah Ilmiah Sultan Agung*, vol. 50, no. 127, pp. 23–34, 2018, [Online]. Available: <http://jurnal.unissula.ac.id/index.php/majalahilmiahsultanagung/article/view/62>
3. Melisa, “Tinjauan Yuridis Terhadap Tindak Pidana Kekerasan Dalam Rumah Tangga yang dilakukan Suami terhadap Istri,” no. 17, pp. 7–32, 2016.
4. S. Susiana, “Kekerasan Dalam Rumah Tangga Pada Masa Pandemi Covid-19,” *Info Singkat*, vol. XII, no. 24, pp. 13–18, 2020, [Online]. Available: http://berkas.dpr.go.id/puslit/files/info_singkat/Info_Singkat-XII-24-II-P3DI-Desember-2020-177.pdf
5. D. AMELIA, “Perempuan dalam Himpitan Pandemi: Lonjakan Kekerasan Seksual, Kekerasan Silber, Perkawinan Anak, dan Keterbatasan Penanganan di Tengah Covid-19,” pp. 5–9, 2021.
6. R. A. Ramadhan, “the Effects of Violence in Household on the Level of Harmony in Families in the Village of Umban Sari Rumbai District Pekanbaru City,” *Jom Fisip*, vol. 5, no. 1, 2018.
7. N. Setyo Wira Rizki, “ANALISIS REGRESI LOGISTIK MULTINOMIAL PADA PEMILIHAN ALAT KONTRASEPSI WANITA (Studi Kasus di Puskesmas Sungai Kakap),” *Bimaster: Buletin Ilmiah Matematika, Statistika dan Terapannya*, vol. 8, no. 4, pp. 751–758, 2019, doi: 10.26418/bbimst.v8i4.36002.
8. T. V. Radhitya, N. Nurwati, and M. Irfan, “Dampak Pandemi COVID-19 Terhadap Kekerasan dalam Rumah Tangga,” *Jurnal Kolaborasi Resolusi Konflik*, vol. 2, no. 2, p. 111, 2020, doi: 10.24198/jkrk.v2i2.29119.
9. S. R. Dafeni, A. Mawarni, D. Nugroho, and Y. Dharmawan, “Hubungan Beberapa Faktor Penyebab Kekerasan Dalam Rumah Tangga (Kdr) Pada Istri Pus Di Kelurahan Tinjomoyo Kecamatan Banyumanik Tahun 2016,” *Jurnal Kesehatan Masyarakat (e-Journal)*, vol. 5, no. 4, pp. 256–264, 2017.
10. E. Ari and N. Aydin, “Examination By Multinomial Logistic Regression Model Of The Factors Affecting The Types Of Domestic Violence Against Women: A Case Of Turkey,” *International Journal of Scientific & Technology Research*, vol. 5, no. 11,

“Factors Influencing Types of Domestic Violence with Multinomial Logistic Regression”

- 2016, [Online]. Available: www.ijstr.org
11. P. L. Kohl, J. L. Edleson, D. J. English, and R. P. Barth, “Domestic violence and pathways into child welfare services: Findings from the National Survey of Child and Adolescent Well-Being,” *Children and Youth Services Review*, vol. 27, no. 11 SPEC. ISS., pp. 1167–1182, 2005, doi: 10.1016/j.chilyouth.2005.04.003.
 12. W. Junilavia, “Pengaruh Sosial Ekonomi Perempuan Terhadap Indeks KDRT,” *Jurnal Paradigma*, vol. 7, no. 3, pp. 1–31, 2019.
 13. E. Sutrisminah, “Dampak Kekerasan Pada Istri Dalam Rumah Tangga Terhadap Kesehatan Reproduksi,” 2018.
 14. B. J. B. M. Sitingjak, “Estimasi Parameter Regresi Logistik Multinomial Menggunakan Maksimum Likelihood,” Universitas Sumatera Utara, 2021.
 15. M. Syarifuddin, “Analisis Faktor-Faktor Yang Mempengaruhi Terjadinya Kekerasan Dalam Rumah Tangga Terhadap Perempuan Dengan Metode Regresi Logistik,” *Jurnal El-Riyasah*, vol. 11, no. 1, pp. 27–36, 2020.
 16. M. Ramadani and F. Yuliani, “Kekerasan Dalam Rumah Tangga (Kdrt) Sebagai Salah Satu Isu Kesehatan Masyarakat Secara Global,” *Jurnal Kesehatan Masyarakat Andalas*, vol. 9, no. 2, p. 80, 2017, doi: 10.24893/jkma.v9i2.191.
 17. A. Yudistanta and M. Ratna, “Analisis Pemakaian Kemoterapi pada Kasus Kanker Payudara dengan Menggunakan Metode Regresi Logistik Multinomial,” *Jurnal Sains Dan Seni*, vol. 1, no. 1, 2015.
 18. M. M. Tulong, M. Mananohas, and C. E. Mongi, “Regresi Logistik Multinomial Untuk Menentukan Faktor-Faktor Yang Mempengaruhi Pilihan Perguruan Tinggi Pada Siswa SMA dan SMK di Pulau Karakelang,” *Jurnal Matematika dan Aplikasi deCartesian*, vol. 7, No 2, pp. 90–94, 2018.
 19. T. Maulana, “Pengaruh Umur, Pendidikan, Pendapatan dan Jumlah Tanggungan Keluarga Terhadap Tingkat Kejahatan Pencurian Dengan Pendekatan Ekonomi,” Universitas Diponegoro Semarang, 2015.
 20. S. R. Dewi, N. Salam, and D. S. Susanti, “Klasifikasi Pemilihan Program Studi Di Fakultas Mipa Universitas Lambung Mangkurat Menggunakan Regresi Logistik Multinomial,” *Jurnal Matematika Murni Dan Terapan Epsilon*, vol. 12, no. 2, pp. 19–29, 2019, doi: 10.20527/epsilon.v12i2.315.
 21. S. Marwiyah, “Dampak sosial ekonomi terhadap tindakan kekerasan dalam rumah tangga,” *Universitas Panca Marga Probolinggo*, 2015.
 22. E. Wibowo, “Married Women’s Experience of Domestic Violence in Malawi: New Evidence from a Cluster and Multinomial Logistic Regression Analysis,” *Nhk 技研*, vol. 151, pp. 10–17, 2015.
 23. V. M. Santi, “Pengembangan Model Regresi Logistik Multinomial untuk Klasifikasi Politik pada Pemilihan Umum,” *Jurnal Statistika dan Aplikasinya*, vol. 2, no. 1, pp. 37–43, 2018, doi: 10.21009/jsa.02105.
 24. H. Nisa, “Gambaran Bentuk Kekerasan Dalam Rumah Tangga Yang Dialami Perempuan Penyintas,” *Gender Equality: International Journal of Child and Gender Studies*, vol. 4, no. 2, p. 57, 2018, doi: 10.22373/equality.v4i2.4536.
 25. D. P. Syah, “Regresi Logistik Multinomial Untuk Analisis Faktor Status Pendidikan Penduduk Kota Pekanbaru Tahun 2018,” 2021.
 26. “p r o b a b i l i t y s a m p l i n g”.
 27. M. Y. Eskawati and Y. Endarto, “Penyebab Kekerasan dalam Rumah Tangga (KDRT) di Kecamatan Bantul Kabupaten Bantul Yogyakarta,” *Jurnal Kesehatan Masyarakat*, vol. 16, no. 1, pp. 59–65, 2017, [Online]. Available: <http://journal.unnes.ac.id/nju/index.php/kemas%0AFAKTOR>
 28. K. Sosial and D. A. N. Kinerja, “Metadata, citation and similar papers at core.ac.uk 1,” vol. 2, no. 1, pp. 1–118, 2009.
 29. H. Harkrisnowo, “domestic-violence-kekerasan-dalam-rumah Tangga dalam Perspektif Kriminologi dan Yuridis.pdf.”
 30. M. Tulong, C. Mongi, and M. Mananohas, “Regresi Logistik Multinomial Untuk Menentukan Faktor-Faktor Yang Mempengaruhi Pilihan Perguruan Tinggi Pada Siswa SMA dan SMK di Pulau Karakelang Kabupaten Kepulauan Talaud,” *d’CARTESIAN*, vol. 7, no. 2, p. 90, 2018, doi: 10.35799/dc.7.2.2018.21456